PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey Of Blackwater Lake

D. A. Jesson
1991

PWFWCP Report No. 98

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave.
3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: D. A. Jesson. 1991. A reconnaissance survey of Blackwater Lake. Peace/Williston Fish and Wildlife Compensation Program. Report No. 98. 22pp plus appendices.

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Prince George, B.C. V2L 3H9

A RECONNAISSANCE SURVEY OF

BLACKWATER LAKE

WATERSHED: PARSNIP RIVER

DATE OF SURVEY: JUNE 7. 8. 1990

FIELD CREW LEADER: D. A. JESSON

FIELD ASSISTANT: A. R. MCLEAN

REPORT PREPARED BY: D. A. JESSON

WILLISTON FISHERIES PROJECT

B. C. HYDRO

ENVIRONMENTAL RESOURCES

and

MINISTRY OF ENVIRONMENT

RECREATIONAL FISHERIES BRANCH

RELEASED BY: _____

D.H.G. Ableson, Regional Fisheries Biologist

LAKE: **BLACKWATER** **SYSTEM NAME: BLACKWATER C.**

A.S.A.P. REFERENCE NO.: **SYSTEM NO: 25-0150**

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved O2/Temp. Profiles	X
Physical Data	X	Winter Dissolved 02/Temp. Profiles	X
Bench Mark	X	Netting Record	X
Terrain Features	X	Lake Catch Summary	X
Access	X	Individual Fish Data	X
Resorts and Campsites	X	Fish Preserved	
Other Developments	X	Stomach Analysis	X
Obstructions and Pollutions	X	Scale Reading	X
Special Restrictions	X	Location of Inventory Sites	X
Aquatic Plants	X	Photograph Directory	X
Wildlife Observations	X	Appendices:	
Miscellaneous Comments	X	A: Water Chemistry Analysis	X
Lake Drainage	X	B: Tributary Stream Data	
Fisheries Management Comments	X	Bathymetric Map Reduction	X
History of Previous Surveys	X	Bathymetric Map	X
Water Chemistry Summary	X		

LOCATION

Location:	36 km NW of Mackenzie		
Elevation:	725 m +/-		
Latitude/Longitude:	55°29'31":123°35'46"	U.T.M.:	10.4624.61495
Management Unit:	7-29	N.T.S. Map No.:	93-0/5

Drainage: Blackwater C. --> Blackwater Arm (Williston Lake Parsnip Reach)--> Peace R.

PHYSICAL DATA

Lake Drainage Area:		Volume:	840,000 m^3
Water Surface Area:	254,000 m^2	Flushing Rate:	
Area above 6 m contour:	254,000 m^2	Perimeter of Islands:	125m
Shoreline Perimeter:	5,130m	Number of Islands:	3
Maximum Depth:	6.0 m	Mean Depth:	3.3 m
Filterable Residue (TDS):	128 mg/l	Secchi Reading:	2.8m

Sounding Device: Lowrance X-15 Elevation Source: Contour interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 30 cm diameter spruce tree located at the access point along the northeast shore of the lake. The tree is located 3 m from the present waters edge.

High water mark: Lake appears to be at flood level, as some alder along the shoreline is submerged at the trunk.

Lake: **BLACKWATER**

TERRAINFEATURES

Immediate Shoreline:

The shoreline is moderately steep to steeply sloped along the west and east shores, making access from land to water difficult, except at the present access point. The north and south ends of the lake are flat marsh. The north marsh consists of moss, sedge grass, and stunted spruce, while the south marsh consists of lily of the valley and moss with a sedge grass fringe. The west/east shores are densely treed to the water's edge with a fringe of alder fronting the shoreline. The lake bottom drops off quickly from shore except for the marsh areas at the ends of the lake. Boating near shore (especially the west shore) can be hazardous due to deadfall in the water. Shoreline substrate consists of organics and sand, with some exposed gravels and cobble. There is some exposed bedrock along the east shore. Two small treed islands are located at the south end of the lake.

Surrounding Country:

Blackwater Lake is surrounded by low rolling hills. Forest cover is complete consisting of mature first growth, except for the northeast and east sides of the lake which have logged areas beyond a 30-40 m fringe of mature first growth. Species present include spruce and Lodgepole pine, with some aspen and birch. Lodgepole pine is dominant at the southeast end of the lake. The fore-mentioned logged area appears to have been replanted with pine approximately 10-15 years ago. Additional logged patches are visible to the north and west, from the north end of the lake.

The Omineca Mountains are located to the west.

Blackwater Lake is situated within the sub-boreal spruce bio-geoclimatic zone.

Lake: **BLACKWATER**

ACCESS

Directions:

From the corner of Mackenzie Boulevard and Centennial Drive in downtown Mackenzie, travel south 29.3 km on Highway 39. Turn right and travel south 3.1 km on Highway 97. Turn right onto Finlay Forest Service Road and travel north 73.2 km. Turn left onto unnamed road. At 1.05 km the road forks (keep left). At 1.45 km road forks (keep left). At 2.55 km road forks (keep right). At 4.65 km road forks (keep right). Road ends at 5.35 km. A 135 m trail leads to the lake. The total distance by road from Mackenzie to Blackwater Lake is 110.95 km.

Road Type and Conditions:

Highways 39 and 97 are paved, two lane roads in good condition.
Finlay Forest Service Road is a fair to good, 2 lane, main haul gravel logging road with some muddy/rough sections.
Access road is in poor to fair condition with the last 0.8 km badly overgrown.
Access trail is ungroomed with exposed tree roots and some deadfall, making walking hazardous.

Restrictions:

None noted.

RESORTS AND CAMPSITES

None. Recreation site potential exists at the end of the access road at the trail head. The Ministry of Forests will be contacted in regard to recreation site development if rainbow trout are stocked into the lake.

OTHER DEVELOPMENTS

None.

Lake: **BLACKWATER**

OBSTRUCTIONS AND POLLUTIONS

Beaver dams on the inlet and outlet are obstructions to fish passage.

SPECIAL RESTRICTIONS

No special restrictions were noted.

AQUATIC PLANTS

Aquatic plants are moderately abundant occurring primarily near shore and at the marsh ends of the lake. A greater abundance of plant life is expected later on in the summer. The following species were identified in the field. None were collected.

Nuphar sp.	Myriophyllum sp.
Equisetum fluviatile	Utricularia sp.

WILDLIFE OBSERVATIONS

Wildlife observations include one beaver, one diving duck, and one eagle. Several beaver huts, moose prints, and numerous game trails were observed.

MISCELLANEOUS COMMENTS

The Ministry of Forests, Mackenzie will be contacted in regards to brushing out the access road (especially last 0.8 km) and grooming and defining the access trail, if the lake is stocked with rainbow trout.
Freshwater clams and frogs were present in and around the lake.
Blackwater Creek was the broodstock source for Peace Canyon Hatchery (Hudson Hope) rainbow trout.
The rainbow were collected at the Finlay Forest Service Road crossing 11 km downstream from the lake.

Bathymetric map: The lake outline is from an enlargement of aerial photograph BC 7366 No. 195, flown July 30, 1971.

Lake: **BLACKWATER**

LAKEDRAINAGE

General:

Stream systems of the Blackwater Lake drainage consist of one inlet and one outlet (Blackwater Creek).
Blackwater Creek flows north 29 km through low-lying terrain to the Blackwater Arm of Williston Lake (Parsnip Reach).

Major Systems:

Blackwater Creek - outlet

A beaver dam (35 cm in height) located approximately 150 m downstream of the lake is responsible for raising the lake level and flooding foreshore alder. The first 200 m of outlet has no salmonid spawning potential and consists of a series of inter-connected beaver dams and ponds. The substrate is 100% organics. More beaver dams and ponds are expected to occur downstream, however, no investigation took place. The heavy infestation of beaver negates any enhancement potential in proximity of Blackwater Lake.

Minor Systems:

Unnamed C. - inlet

The inlet drains a small pond and flows into the south shore of the lake's north end. The pond is approximately 150 m from Blackwater Lake.
A beaver dam (35 cm in height and 35 cm in length) is located approximately 30 m upstream from Blackwater Lake. No salmonid spawning habitat is present in the initial 30 m. The resulting beaver pond upstream of the dam has an average wetted width of 8 m and average depth of 0.5 m. The substrate is 100% organic with no salmonid spawning potential.
The investigation terminated at this point, with more beaver dams and ponds expected upstream.

Lake: **BLACKWATER**

FISHERIES MANAGEMENT COMMENTS

Two overnight net sets produced 3 rainbow trout, of which two were spawnbound. No salmonid spawning habitat in the inlet or outlet, due to beaver activity, probably accounted for the spawnbound condition. Other fish species in the lake include burbot, coarse sucker, longnose sucker, and lake chub.

Prior to any consideration of a rainbow trout stocking program, winter oxygen/temperature levels should be determined as maximum water depth is only 6 m.

If suitable readings are obtained, it is recommended the lake be stocked with low numbers of native rainbow trout and managed for a low use fishery (Burden Lake is nearby and is presently stocked with rainbow). It is suggested that the lake be spring stocked with 5000 (10 gram) rainbow trout initially, with further stocking depending on fish survival and angler use. The lake will require a continuous stocking program as no spawning habitat is present. As a result, spawnbound fish will be a reality. Stock assessment should be undertaken 3 years after the first stocking.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Surveys:

McLean, A., 1990. Biophysical Reconnaissance of Blackwater Creek.
Ministry of Environment, Prince George, British Columbia. Unpublished data sheets.

Lake: **BLACKWATER**

WATER CHEMISTRY SUMMARY **Limnology Station No. 1**

Field Conditions:

Date:	June 8, 1990		
Time:	1330 hrs	Air Temperature:	19°C
Wind Velocity:	5 km/hr	Wind Direction:	south
Cloud Cover:	7/10 o.c.	Surface Condition:	slight ripple
Secchi Disc:	2.8 m	Water Colour:	slightly tannic

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
pH (field):	Digital pH pocket tester
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No.: Not determined

	Sampling Depths	
	Surface (O m)	Lower (5.0 m)
pH (field)	8.1	7.6
pH (lab)	7.9	7.6
Specific Conductance (lab)	165 umhos/cm	180 umhos/cm
Filterable Residue 105°C (lab)	128 mg/l	136 mg/l
H2S (field)	- mg/l	O mg/l

Bottom Depth:	5.8 m
Substrate Sample Depth:	- m

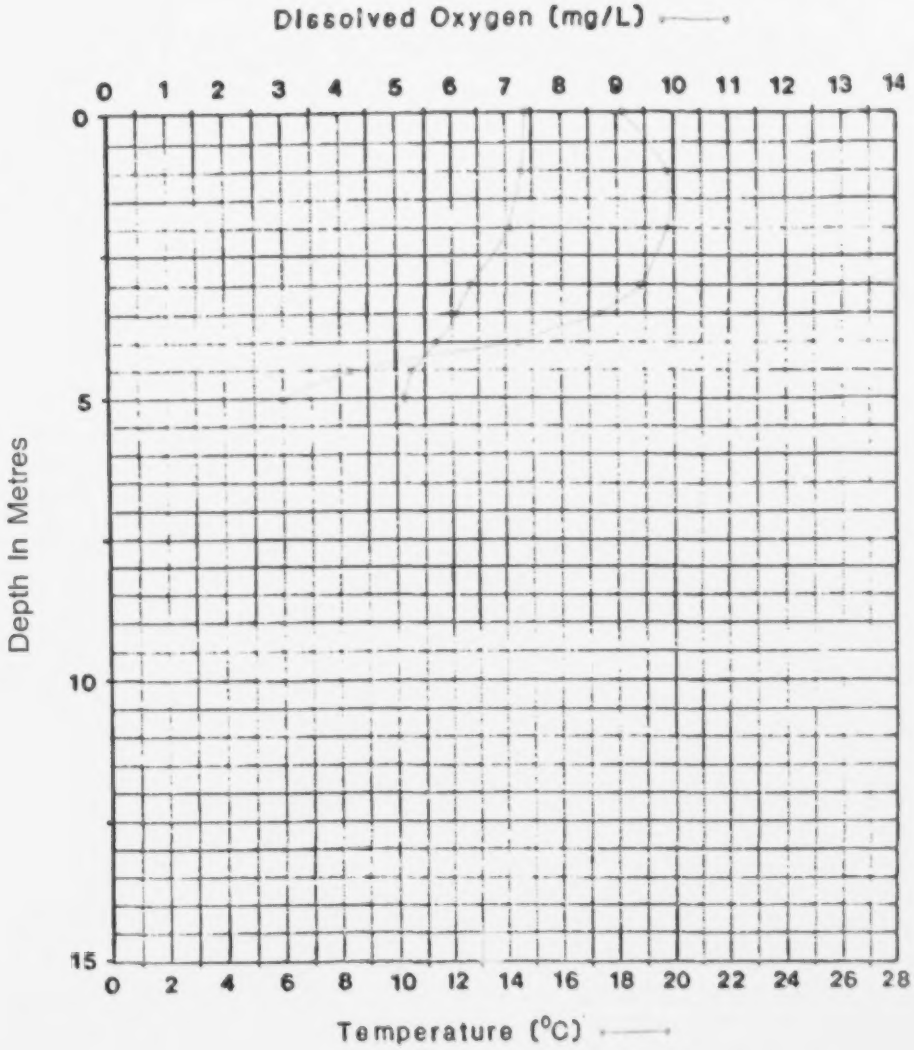
Lake: **BLACKWATER**

DATE: June 8, 1990

SUMMER OXYGEN/TEMPERATURE DATA

Depth (m)	02 (mg/l)	Temp (°C)
surface	9.2	14.9
1.0	9.9	14.7
2.0	9.9	14.2
3.0	9.4	12.8
3.5	8.7	12.1
4.0	7.3	11.4
4.5	4.2	10.7
5.0	3.0	10.3
5.8	BOTTOM	

DISSOLVED OXYGEN AND TEMPERATURE PROFILE



Lake: **BLACKWATER**

DATE: March 19, 1991

CREW: Alister R. McLean

WINTER OXYGEN/TEMPERATURE DATA

Depth (m)	02 (mg/l)	Temp (^{0}C)
surface	-	-
0.5	-	-
1.0	6.9	1.8
1.5	5.7	2.2
2.0	5.2	3.1
2.5	3.8	3.8
3.0	3.0	4.0
3.5	1.2	4.3
4.0	0.8	4.5
4.5	0.5	4.8
5.0	0.4	5.2
5.5	0.3	5.6
6.2	Bottom	

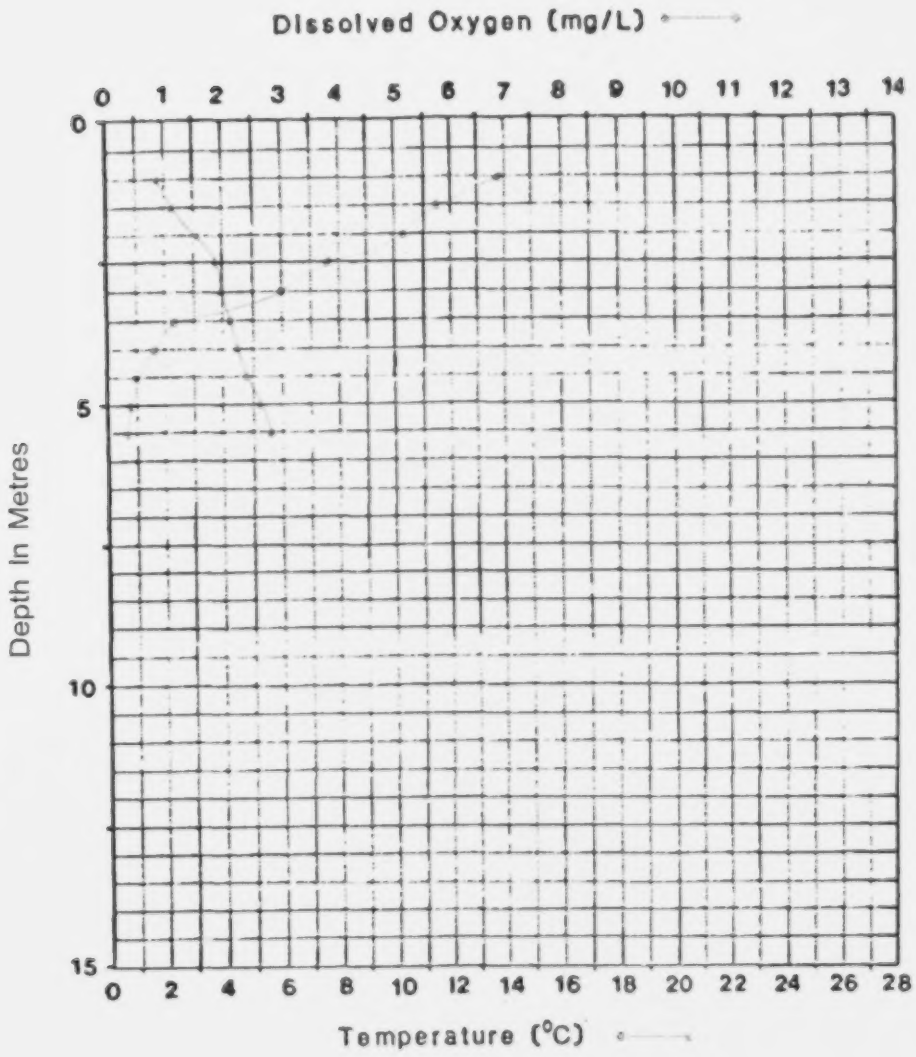
Time:	1100 hrs	Air Temp:	7 °C
Ice Depth:	65 cm	Snow Depth:	20 cm
Max. Depth:	6.2 m	Weather:	Overcast
Wind:	Nil		

Depth readings are referenced from top of ice. ie. surface = top of ice.

Method: YSI model 58 oxygen/temp, meter

WINTER

DISSOLVED OXYGEN AND **TEMPERATURE** PROFILE



Lake: **BLACKWATER**

NETTING RECORD

Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE #1

Type:	Sinking monofilament		
Date Set:	June 7, 1990	Time:	1615 hrs
Date Lifted:	June 8, 1990	Time:	1100 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	2.0 m
		Substrate:	organics
Deep End Mesh Size:	64 mm	Depth:	4.5 m
		Substrate:	organics

Comments:
Lake chub were gravid.
Longnose sucker had spawning colours.

NETTING SITE #2

Type:	Sinking monofilament		
Date Set:	June 7, 1990	Time:	1630 hrs
Date Lifted:	June 8, 1990	Time:	1200 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	2.0 m
		Substrate:	organics
Deep End Mesh Size:	64 mm	Depth:	4.5 m
		Substrate:	organics

Comments:

Lake: **BLACKWATER**

LAKE CATCH SUMMARY

SPECIES	NET SITE NO.				ANGLED	OTHER	TOTAL	NUMBER SAMPLED	NUMBER PRESERVED	SIZE RANGE (cm)
	1	2	3	4						
Rainbow trout	2	1			-	-	3	3	-	38.0 - 41.0
Longnose sucker	30	19			-	-	49	-	-	10.0 - 37.4
Coarse sucker	4	1			-	-	5	-	-	12.9 - 40.0
Lake chub	36	90			-	-	126	-	-	9.7 - 10.5

Comments:

Minnow Traps:

BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	19.0	1.0	organics	2 burbot 2 longnose suckers 13 lake chub 17 leeches	15.7 and 19.6 9.5 and 11.2 6.0 - 9.7
2	19.0	1.0	organics	1 burbot 1 lake chub 5 leeches	11.5 8.9

Comments:

Lake: **BLACKWATER**

INDIVIDUAL FISH DATA

Date Captured: June 8, 1990

Method of Capture: Sinking monofilament gillnet

M -Male
F -Female
? -Not Obvious

IMM -Immature
MG -Maturing
MT -Mature
GV -Gravid
SP -Spent
? -Not Obvious

EG -Egg
FR - Fin Ray
HD -Head
ML -Milt
OT -Otolith

SC -Scale
ST - Stomach
TG -Fish Tag
WF -Whole Fish

Species	Fork Length (cm)	Weight (g)	Sex	Gonadal maturity	Sample Type	Age (Yr)	Stomach Contents: Plankton	Insects	Fish	Other	Comments
Rainbow trout	38.0	650	F	MG	SC	3+		beetles		detritus	leeches in mouth; nice fish; silver coloured.
Rainbow trout	40.6	780	M	GV	SC	3		beetles		detritus	tapeworm cysts on gut; scales resorbed.
Rainbow trout	41.0	790	M	GV	SC	3		beetles, leech		detritus	tapeworm cysts on gut; scales resorbed.

Age determination completed under contract by:

Margaret McDonald
Box 243
Midway, B.C.
VOH 1MO

Lake: **BLACKWATER**

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R3:2	1	View south of Blackwater Lake from limno station.
R3:3	2	View north of Blackwater Lake from limno station.
R3:4	3	View south towards marsh at south end of Blackwater Lake.
R3:5	4	View north from south end of lake.
R3:6	5	View north towards marsh at outlet end of lake.
R3:7	6	View south from north end of lake.
R2:22	7	View upstream on inlet from beaver dam located 30 m upstream from lake.
R2:23	8	View north of Blackwater Lake outlet (Blackwater Creek) from lake.
R2:25		View downstream of Blackwater Creek approximately 60 m downstream from lake.
R2:24	10	View upstream of Blackwater Creek from beaver dam located 150 m downstream of lake. The dam (not in photo) is responsible for raising lake level and flooding foreshore area.

Lake: BLACKWATER

Plate 1: View south of Blackwater Lake from limno station.

Plate 2: View north of Blackwater Lake from limno station.

Lake: **BLACKWATER**

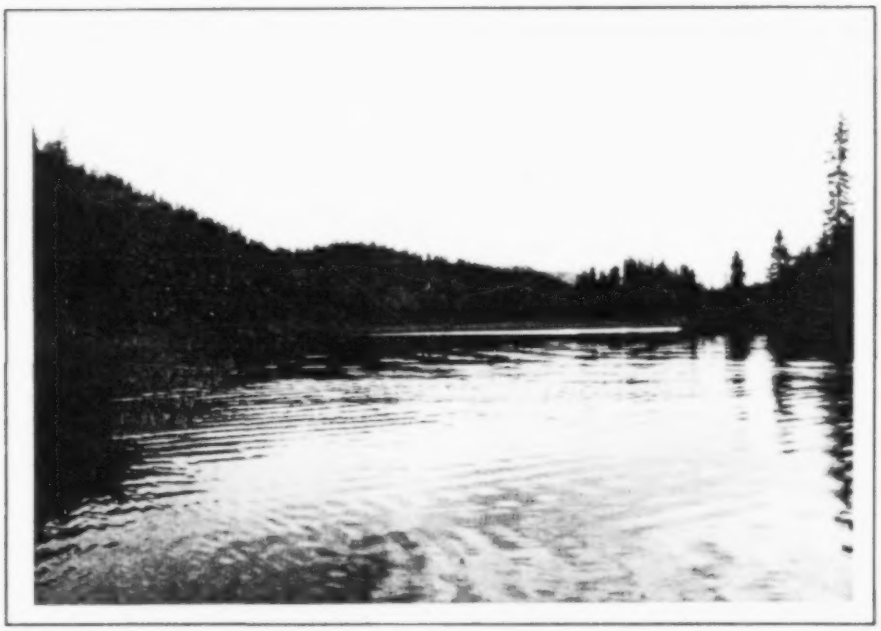


Plate 3: View south towards marsh at south end of Blackwater Lake.

Plate 4: View north from south end of lake.

Lake: **BLACKWATER**

Plate 5: View north towards marsh at outlet end of lake.

Plate 6: View south from north end of lake.

Lake: **BLACKWATER**

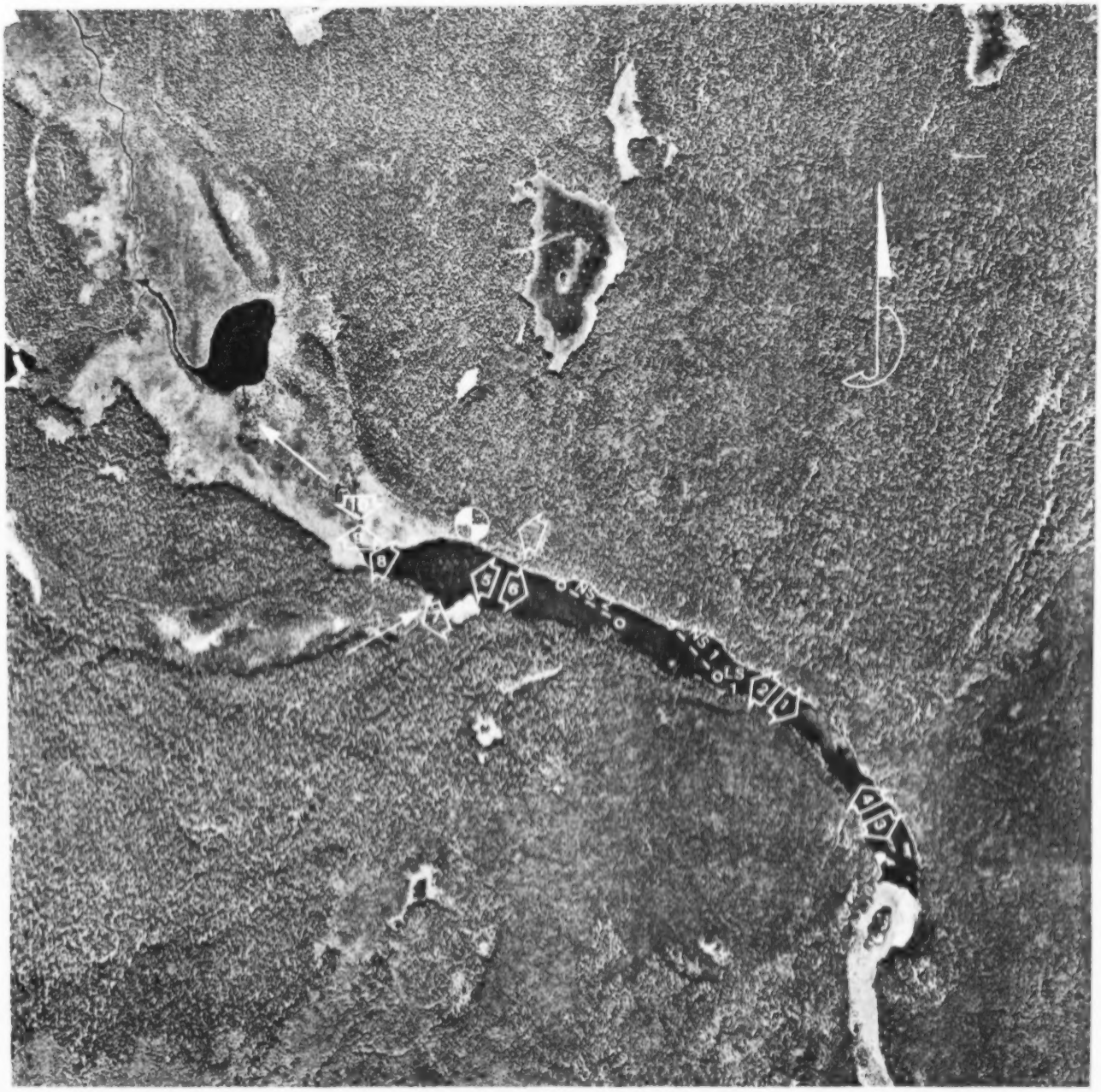
Plate 7: View upstream on inlet from beaver dam located 30 m upstream from lake.

Plate 8: View north of Blackwater Lake outlet (Blackwater Creek) from lake.

Lake: **BLACKWATER**

Plate 9: **View** downstream of Blackwater Creek approximately 60 m downstream from lake.

Plate 10:View upstream of Blackwater Creek from beaver dam located 150 m downstream of lake.
The dam (not in photo) is responsible for raising lake level and flooding foreshore area.



LOCATION OF INVENTORY SITES

Figure 1

Lake: Blackwater
Reference No.: B.C. 7366:195
Reference Date: July 30, 1971
Scale: 1: 17,610

Plate number, area and direction

Point sample, number and location

Bench mark

LS 1 Limno station location and number

0----0 NS 1 Netting site location and number

1 Stream flow direction and number

- - - - Intermittent stream

Lake: BLACKWATER

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

[illegible] JENON ENVIRONMENTAL INC. [illegible]
B.C. LABORATORY [illegible]
Report for form [illegible]
[illegible] - PRINCE GEORGE [illegible] ATTN: [illegible] R.G.

Site: [illegible] WATER LAKE

Submitted by [illegible] R.G.

Address: [illegible] Waste Management Branch
Northern Region
[illegible] Floor, [illegible] 4th Avenue
Prince George, BC [illegible]

Phone No. [illegible]

Audit Sample [illegible]
Client study reference [illegible]
Sampling agency code [illegible]

Site: [illegible] BLACKWATER LAKE

Sample Adjective: [illegible]
Sample State: [illegible] Fresh Water
Sample Descriptor: [illegible] Underlines

This form was processed by the computer on [illegible] 1990 as REGULAR
[illegible] for analysis samples for this form [illegible]

[illegible] analysis	[illegible]
Special analysis	[illegible]
[illegible]	[illegible]

B.C. MINISTRY OF ENVIRONMENT
JUL 10 1990
RECEIVED
PRINCE GEORGE, B.C.

[illegible] TEMON ENVIRONMENTAL INC. [illegible]
[illegible] LABORATORY [illegible]
Report for Form [illegible]

[illegible] - PRINCE GEORGE ATTN: [illegible] [illegible]

Site: [illegible] LANE

[illegible] To: [illegible]
[illegible] Tide
[illegible] Fresh Water
[illegible]

Parameter Description	Result	Units	Analytical Technique (Arrows/Section [illegible])
[illegible]	[illegible]	pH [illegible]	Automated pH Meter [illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Conductance	[illegible]	[illegible]	Lead Meter Diesel [illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Total [illegible]	[illegible]	[illegible]	Automated Electrometer [illegible]

[illegible] ENVIRONMENTAL [illegible]
[illegible] LABORATORY [illegible]
Report for form [illegible]

[illegible] PRINCE GEORGE ATTN [illegible] Sheet [illegible]

Site: NOSITE [illegible] WATER LAKE

From: [illegible]/08/08 0002 To: [illegible]/08/08 0002
Depth Range: 5.0 [illegible] Time:
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Operands/Medium/Fixed)
pH	[illegible]	pH [illegible]	Automated pH Meter (00041220/03/01)
[illegible]	[illegible]	mg/l	[illegible] Bushnell [illegible] (00061070/02/01)
[illegible] Conductance	[illegible]	µS	Cond Meter Gieboid (00111160/02/01)
[illegible] Filterable 1.0µ	[illegible]	mg/l	Gravimetric 1.0µ Filter (00[illegible]/02/01)
[illegible] Total [illegible]	[illegible]	mg	Automated Electrometer (01[illegible]/03/01)

Reduced to
33%
of Original
INSET MAP
STATISTICS AT TIME OF SURVEY
ELEVATION
SURFACE AREA
AREA ABOVE 6m CONTOUR
VOLUME
MEAN DEPTH
MAX DEPTH
PERIMETER, MAIN SHORE
PERIMETER, ISLANDS
BENCH MARK HEIGHT ABOVE WATER LEVEL
RECREATIONAL FISHERIES BRANCH
HABITAT MANAGEMENT SECTION
BLACKWATER LAKE
DEPTHS IN METRES
1:2500
930-75